

WHAT IS CLAIMED IS:

1. A DNA construct comprising:
as components, a transcriptional initiation region from a gene capable of expression in a chloroplast joined to a heterologous DNA sequence encoding a polypeptide of interest, wherein transcription of said DNA sequence is regulated by said initiation region, and a transcriptional termination region.
- 10 2. The DNA construct according to Claim 1, wherein said gene is a chloroplast gene.
- 15 3. The DNA construct according to Claim 1, wherein said gene is a psbA gene, rbcL gene or atpB gene.
4. A chloroplast expression vector comprising:
a transcriptional initiation region from a gene capable of expression in a chloroplast, a DNA sequence comprising at least one cloning site and a transcriptional termination region.
- 20 5. The expression vector according to Claim 4, wherein said gene is a chloroplast gene.
- 25 6. The expression vector according to Claim 4, wherein said gene is a psbA gene, rbcL gene or atpB gene.
- 30 7. The expression vector according to Claim 4, wherein said cloning site is a multiple cloning site.
- 35 8. The expression vector according to Claim 4, wherein said transcriptional termination region comprises at least one of a ribosomal RNA T1 or a ribosomal RNA T2 terminator.

9. The expression vector according to Claim 4,
further comprising:

a heterologous DNA sequence encoding a polypeptide
of interest inserted into said cloning site in reading
5 frame with said transcriptional initiation region.

10. A replication vector comprising:

a DNA fragment comprising a replication origin
capable of providing for autonomous replication in a
10 chloroplast, a transcriptional initiation region from a
gene capable of expression in a chloroplast, a DNA
sequence comprising at least one cloning site and a
transcriptional termination region.

15 11. A chloroplast comprising:

a DNA construct comprising, as components, a
transcriptional initiation region from a gene capable of
expression in a chloroplast joined to a heterologous DNA
sequence encoding a polypeptide of interest, wherein
20 transcription of said DNA sequence is regulated by said
initiation region, and a transcriptional termination
region, wherein said components are operably linked in
vitro.

25 12. A chloroplast comprising:

a chloroplast expression vector comprising, as
components, a DNA fragment comprising a replication
origin capable of providing for autonomous replication
in a chloroplast, a transcriptional initiation region
30 from a gene capable of expression in a chloroplast, a
DNA sequence encoding a polypeptide of interest and a
transcriptional termination region, wherein said
components are operably linked in vitro.

35 13. A plant cell comprising:

a chloroplast according to Claim 11 or Claim 12.

14. The plant cell according to Claim 13, wherein said cell is monocotyledenous or dicotyledenous.

5 15. A dicotyledenous plant comprising:
cells containing chloroplasts according to Claim 11
or Claim 12.

10 16. A method for introducing heterologous DNA into a chloroplast, said method comprising:

transforming a chloroplast in a plant cell with an expression vector comprising, as components, a transcriptional initiation region from a gene capable of expression in a chloroplast, a heterologous DNA sequence encoding a polypeptide of interest and a transcriptional termination region, wherein said components are operably linked in vitro.

15 17. The method according to Claim 16, wherein said expression vector further comprises:
20 a DNA fragment comprising a chloroplast replication origin.

25 18. A method for specifically modifying the phenotype of a chloroplast distinct from other organelles, said method comprising:

30 introducing into a chloroplast in a plant cell, a chloroplast expression vector comprising, as components, a DNA fragment comprising a chloroplast replication origin, a transcriptional initiation region from a chloroplast gene, a DNA sequence encoding a polypeptide of interest and a transcriptional termination region, wherein said components are operably linked in vitro and are functional in said chloroplast; and
35 growing said cell whereby the phenotype is modified as a result of expression of said DNA sequence.

19. The method according to Claim 16, wherein said introducing comprises:

bombarding said plant cell with a DNA construct comprising said expression vector adsorbed to a bombardment particle.

5 20. A chloroplast containing heterologous DNA, prepared according to the method of Claim 19.